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ABSTRACT

In many countries throughout the world, efforts to articulate the knowledge, skills, and abilities required of workers have translated into the development of organizations with the specific charter to establish industry-based skill standards with attendant new and/or expanded forms of certification of competencies. The new emphasis on skill standards may be traced to many factors, including shifts in production processes and occupations, recognition of the fact that production must accommodate the environment, and the realities of the labor pool. Throughout the world, systems of initial preparation for work are undergoing significant change, and recognition that education and learning must take place in both schools and the workplace is increasing. The system in place to keep workers prepared for work (including lifelong learning, distance education, continuing professional development, and job training) is arguably the weakest link in almost every country's strategy to ensure a skilled work force. Australia's new system of occupational and industrial core and technical standards and eight competency levels provides a framework for accomplishing the following: identifying and developing transferable skills across industries; elaborating career paths within industries; and ensuring correspondence between earning a degree and acquiring the types of competencies required for working at various levels. (MN)

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AITD Conference Paper

Skill Standards: The Value for Industry and Instruction

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THE CONTEXT

My assigned task is to provide a global perspective on how the technical tools of skill standards are being used by industry and the education and training communities. There is no way to do justice to the substantial variations between and within countries. Therefore, the emphasis in this paper is on trends and connecting threads of issues and responses in several countries. The countries include but are not limited to Australia, Denmark, Germany, France, Japan, New Zealand, Scotland, United Kingdom, and the United States.

Each of these countries have developed, or are in the process of developing, formal procedures that link the employers and education and training providers together. At the core of these efforts is the articulation of the knowledge, skills, and abilities required of workers. In several countries this has been translated into the development of new (or modified) organizations with the specific charter to establish industry based skill standards with attendant new and/or expanded forms of certification of competencies. The utility of standards has been summarized in the following way. They help to:

- ensure quality
- indicate goals and
- promote change.

Standards facilitate:

- communications
- protection
- harmonization
- simplification and
- valuation.

The communication value of standards is of special note because of employers' need to provide signposts to schools, students and current workers about what jobs in their organizations require.[1]
As with most standard-setting efforts, skill standards have to be negotiated among the various stakeholders. Many countries have formal processes for engaging employers in standard-setting efforts. It requires a process to establish the common language and the common processes necessary for stakeholders to arrive at descriptions of what workers need to know and be able to do.

The Realities of the New Economy

Whatever the details of the processes used to develop the standards, there are "drivers of change" which need to be considered and accommodated as skill standards are developed and/or modified.

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1 Sivan Y.Y., "The Pandora's Box of Standards for Education". Technos, Washington D.C., Summer 1993

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1. Shifts in Production Processes

There are growing global trends in production processes and quality management that are making the long Taylorist assembly lines, which could only produce one model, a story of yesteryear. These include:

- flexible production lines to accommodate customized products, based on just in-time delivery systems;
- ever increasing use of computer-assisted technologies;
- priority to customer satisfaction as an essential standard; and,
- capital to labor ratios continuing to expand.

These processes are the norm in a few countries (Japan and some Western European nations) and the standard in the more advanced businesses in others, yet they are only appearing in other countries and businesses. For now, they represent the new reality -- the new standards to which both public and private sector enterprises should try to reach. These forms of production processes demand more mentally agile workers who can be problem-solvers not just human robots preforming repetitive tasks.

2. Shifts in the Impacts of Technologies

The Organisation for Economic Co-Operation and Development (OECD) asserts that information has upstaged land, labor, and capital as the most important input in modern production systems. There is strong evidence that an infrastructure change is taking place due to these information technologies. The new technologies allow operators to access previously unavailable information. Different skills are required of the machine's users. As the technical infrastructure deepens in the workplace, many blue collar workers will need to understand more about the production systems in order to participate in decisions formerly reserved for higher level occupations. There is increasing recognition that technologies are often underutilized or used inefficiently. Successful introduction of technologies is directly tied to the organizational structure and to human factors inside the institution.

Four characteristics of successful technology adaptation have been summarized as the four F's: focused, fast, flexible, and friendly[2]. To successfully apply the four F's the U. S. National Academy of Engineering identified characteristics of any organization that are needed to achieve technology adaptation including the following: These include: employee involvement, training, incentives, fluid organizational structures, matching the technology to the problem that needs to be solved and committed leaders.

This list suggests that the introduction of new technologies can present as many human resource management issues as engineering challenges. Individual firms that have flexible organizational structures and are located in countries that promote employee involvement and trialling are better positioned to make the most successful use of new technologies.

3. Occupational Shifts

In many countries changes are also occurring within occupations. Professional bureaucracies have spawned new specialized occupations and the growth of larger corporations has created more

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2 National Academy of Engineering, National Research Council, People and Technology in the Workplace, Washington D.C. National Academy Press, 1991.

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demand for professional services such as legal, accounting and medical. Also the growth of science and its commercialization has helped create new, highly specialized occupations.

Because of these two trends, there has been a growth of specialists that are in "more valued" occupations. Additionally, experience has shown the specialization model demands more collaboration among a variety of workers to obtain the breadth and depth of expertise to accomplish the work.

Many new technical occupations blend the attributes between the professional and craft worker in such areas as bioscience engineering, radiological, medical technicians, technical writers, computer programmers, etc. These jobs often require specialized education, especially in science, math and technology. However, it is important to note that the evidence to date shows the lost valuable place to obtain skills appears to be on the job allowing the development of the "technical craft artist."[3]

These "new crafts" provide a particular set of challenges for governments and institutions in determining competencies and skill requirements, in part, because they do not yet have a strong base of professional societies nor do many "guilds" exist for them even in the strongly unionized countries. Also the jobs should not be cast in a vertical model of career progression that assumes increased supervisory responsibility is the most important ingredient. The results may end up stifling necessary workplace reorganization.

Taken together, these trends are pushing out the boundaries of skill requirements for both new entrants and current workforce members in workplaces all over the globe. They are broadening the basic knowledge and skills base requirements for all workers while simultaneously promoting new forms of specialization.

These boundary shifts are pushing the publicly supported human resource development infrastructures to readjust to these new realities. Additionally, both industry and the education and training systems must accommodate environmental and demographic realities.

Two other types of pressures are having a substantial influence on the new economy:

1. Production Must Accommodate The Environment

All countries must deal with protection of the environment in ways not even considered less than a quarter of a century ago. For several occupations some knowledge of health and safety factors is included in the "required competencies ." However this may not be sufficient.

An example of what the U.S. is facing just to address the problems of clean up helps illustrate the point. For our country, it is estimated that one trillion dollars has been spent on clean up in the last two decades and some estimates are that as much as 100 billion a year must be spent for several more years in order to complete the task. Prevention must become a part of the strategic planning

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3 Barley, Stephen R. The New Crafts: on the Technization of the Workforce and the Occupationalization of Firms, National Centre on the Educational Quality of the Workforce, University of Pennsylvania, Philadephia, Pennsylvania, November 1991. Dr Barley's work provides very useful insights regarding the implications of occupational shifts.

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process, including those for the education and training system, in all countries.[4] The figures will vary in other countries, as well as government strategies to solve the problems, but most would agree that the production processes must accommodate the environment, not vice-versa. This is not a side-bar issue. Education programs for all students need to include environmental protection materials in the curriculum.

2. The Realities of the Labor Pool

Almost any list of statistics thai analyzes the potential labor supply pool essentially suggest the same implications. Broadly defined the two most important ones for most countries are the necessity to:

- Build in continual preparation at the work site for those already in the workforce and;
- Draw increasingly from the pool of the "marginal workforce."

The age structure of the active working population in the European Community (EC) provides an example of the challenge. Over 80 percent of the individuals who will be available for work at the turn of the century are already at work. Many of these individuals received their initial education and training during a period when higher education was restricted to a small elite. Additionally, the knowledge and skills acquired during the initial education and training is declining in usefulness.[5]

It follows that there is less tolerance in the work place for low-level entry workers. Consequently, early school leavers, poorly prepared students (particularly in mathematics, sciences and communication skills) not only personally suffer but they represent a cost to society that cannot be tolerated. Taken together, these pulls and pushes exist in all of the industrialized societies and more so in less developed countries, though the supply of workers as well as the access to technologies and capital are dramatically different.

IMPLICATIONS FOR THE LEARNING ENTERPRISE

The term learning enterprise is used to recognize that education and learning can and should take place in multiple settings, including the workplace. In other words, the learning enterprise is the sum of the parts of the total education and training system in any country.

Initial Preparation -- Undergoing Change

In any country, the quality of the initial preparatory system remains central to the effort to have a skilled workforce. The most important imperative is to assure there are clear policies to close the educational gaps between the "haves" and "have nots." Without real action to bring up the "bottom" (however characterized), the current divide between these two groups will only widen. This is no longer an economically affordable option.

There are few countries that have not recently, or are currently going through, some form of review of its initial preparation system (compulsory education). Curricula are being changed, vocational preparation programs are being reevaluated to incorporate more academic materials, governance structures are

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4 Leo P Duffy, Asst Secretary for Environmental Restoration and Waste Management, U.S. Dept. of Energy, article in Focus of the National Centre on Manufacturing Sciences, Ann Arbor, MI, USA, April 1992

5 OECD, Higher Education and Employment: The Changing Relationship, Report of the Commission of the European Communities, Paris France, 1992

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being realigned, assessment systems are being reviewed, and more emphasis and resources are being made available for the populations that have long been regraded as on the "margins."

Having a solid education foundation is undeniably essential but alone it represents an insufficient strategy for any country.

Continual Preparation

Arguably the weakest link in almost every country's strategy to assure a skilled workforce (with the possible exception of Japan) is the need for a rational set of strategies to assure continual preparation for the total workforce. (Japan stands out due to the steady state of investment in structured learning of a company's employees and to the teaching responsibilities of the supervisors built into most of the companies' career ladder progressions.)

A definition is in order. The use of the term continual preparation is an effort to capture several different concepts used with varying meanings in individual countries. It includes: life-long learning, continuing education, multimedia, open/distance learning, continuing professional development and just plain job training. There are no easy cross-country comparisons of what is happening regarding any one of the specific categories. Even with this important caveat there is a great deal of evidence to suggest that continual preparation is a weak link in the human resource development infrastructure. There are several reasons for this.

First is the tradition of "front loading" the public investment in preparation for the workplace. Front loading means the investment in primary, secondary and initial technical education. Another is the tradition of almost all governments of targeting the limited public training resources on select portions of the population that need retraining due to major economic dislocations or select targeted populations such as re entrants, the disabled, sometimes immigrants, or welfare recipients.

Factored into any of the schemes for continual preparation must be a set of decisions about whom and what should drive the system for continual preparation and also what role should be expected of the institutions that comprise any country's learning enterprise.

Where is Integration the most Important?

The business enterprise level is where ultimately integration of education and training strategies must occur. Part of the challenge for governments or other social partners is identifying the least non-intrusive techniques that can be employed to promote maximum utilization of employees within those enterprises. Arguably one of the most powerful tools would be to reassess the tax treatment of business assets. Currently, the international pattern is that human resource expenditures are counted on the expense side of the ledger, not the investment side. Until it is possible to have the corporate board room address the utilization of intangible assets (people) in much the same fashion that capital assets are treated. support for continual learning will be weak. Tax collectors and accounting standards bodies will most surely not quickly embrace such a recommendation but the time has come for at least a serious national and/or international dialogue to begin.

Work in this arena may be one of the most important preconditions of a truly integrated workforce preparation system in any country simply because it will place the loci of decision making at the most important press point -- the work place.

It is also important to not assume that formal education and skills training are the only factors contributing to the economic growth of an enterprise. As part and parcel of any integration strategy to improve productivity, assistance to firms targeted on improving overall business strategies is an essential ingredient.

Improved Business Strategies are Central

- Business strategies need to include the development of systems to assure continuous improvement to satisfy the needs of external and internal customers.

- Companies need strategies to address the dual (sometimes contradictory) concepts of decentralized decision making combined with the need to achieve integration between and among departments and systems (financial, technical, human resource management, planning and development, etc.).

Based on the experience in the USA, Western Europe, and Japan, it appears the most effective strategy for governments is providing technical support throughAgain, calling upon the work of OECD and others, several emergent issues and recommendations regarding the role of higher education institutions need to be considered.

- Continual preparation should be shaped by the needs of the customers (enterprises and their employees). This would represent a fundamental transformation that moves the power from the producers to the consumers, it implies a transformation in pedagogy where teaching is but one contribution towards the process of learning and a variety of technologies can be used by the student.

- Clear learning outcomes rather than content and duration should drive the learning process. Without this shift, integration of education and training with the needs of the work place will not be realized.

- Institutions of higher education need to recognize and accredit learning that takes place outside the "traditional classroom." The companion strategy to this is that industry driven skill certification systems need to have an equivalency level factor built into their system that can be traced by institutions of higher education.

- A fresh look is needed regarding how instructors are recognized and certified [6]

This is really a beginning list of issues for governments and all forms of institutions of higher education need to grapple with before integration of polices can occur and appropriate linking networks with secondary education systems and private enterprises can meet the needs of the next century.

SETTING AND USING STANDARDS

In some countries there has been a long tradition of social partnerships among education, employee, and employer organizations that focus on communicating skill requirements of the workplace for use in instruction and curriculum. In the main these partnerships have devoted most of their energies on the initial preparation period. The resulting systems have either been school-based (e.g., Nordic countries, France) or apprenticeship systems including compulsory schooling (e.g., German-speaking countries.) Generally the standards are embedded within the curriculum or instructions from the central government to the schools and are also incorporated in the competency tests required for graduation or certification.

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6 Wright, Peter W.G., Higher Education and Employment: The cHanging Relationship, Recent Developments in Continuing Professional Education, Report of the Commission of the European Communities, OECD/CEC, Paris France, 1992. This report provides an excellent overview of the education and training needs of small and medium-sized employers and an assessment of the capacity of "traditional" post-secondary education institutions to address those needs. The listing of issues in the paper are drawn, in part, from this study because it summarises well the common themes that can be found in similar proper analysis in Europe and other industrialized countries.

Until more recently, the Anglo-Saxon countries have not had the same type of structured mechanisms to establish work-based standards for use across the curriculum in secondary schools and technical institutes. Over the last decade this has changed and an increasing number of the Anglo Saxon countries have joined the ranks of countries which have established skill standard setting processes. The United States has just in this past year become one of those. The rhetoric embodied in the authorizing legislation suggests there is great faith in the value of skill standards.

The National Skill Standards Act sets forth a vision regarding what a voluntary skill standards system can help accomplish. The Act says skill standards should be used:

- by the nation for ensuring the development of a high skills, high quality, high performance workforce, including frontline workers;
- by industries to inform training providers and prospective employees of needed skills;
- by employers to evaluate the skill levels of prospective employees and assist with the training of current employees;
- by labor organizations to enhance employment security through portable credentials and skills;
- by workers to obtain certifications of skills, pursue career advancement, and enhance their abilities to reenter the workforce;
- by students and entry-level workers to determine needed skill levels and competencies for the workforce;
- by training providers and educators to ascertain appropriate training services; and,
- by government to evaluate publicly-funded training; facilitate transition to high performance work organizations; increase opportunities for minorities and women in the workforce; and facilitate linkages with other national efforts aimed at enhancing workforce skills, such as school-to-work transitions, vocational technical education, and job training programs.

The intent is to cross the boundaries of education institutions, training organizations and workplace. These are clearly lofty goals and it is, of course, too soon to know if vision will become a reality and be voluntarily used by industry and the learning enterprise. In order for there to be any chance of success it will be necessary to redirect public policies and funds of both the federal and state governments as well as within the private sector. While the newly started National Skill Standards Board (NSSB) can help organize the effort, just as its counterpart in other countries have done, they will not be the only actor. For example, a state government will need to decide how it wants to use skill standards in its own workforce development system. They will need to answer a series of questions such as should a skill standards system:

- Be targeted to specific people or types of jobs?
- Apply to all types of education and training?
- Promote career paths within and between industries?
- Use only competency-based curriculum and training materials?
- Require third party documentation of an individual's skills, including all students?
- Align with nationally recognized multi-level skill standards?
- Use a common language to describe skill levels across industries and occupations?

The United States's legislation is built upon lessons gleaned (benchmarked) from the experience of other countries including Australia, Denmark, Germany, Japan, and the United Kingdom. Each of these countries has developed systems to meet its own purposes.

Australian Approach: An Example

Our host country, Australia, will be used for illustrative purposes. To help the nation become more internationally competitive, they decided to refocus their education and training government agencies and institutions. As a part of this effort a voluntary National Training Board (N I > B) was established. Others here can provide far more

information than I on the detail, trials and tribulations of the NTB and related efforts. But there are many in the United States who believe there is an inherent logic in the framework guiding the NTB's work. The framework allows for transferable skills across industries, elaborates career paths within industries, and ensures a correspondence between earning a degree and acquiring the types of competencies required for working at various levels.

Industry groups identify the standards and are charged with thinking about two types of standards across many different levels -- occupational core standards and industrial core standards.

Occupational core standards include broad-based competencies that must be achieved by all persons in an occupation no matter their particular jobs. These competencies include abilities in numeracy, literacy, occupational health and safety, and communication within the occupational context. In addition, these competencies may include some broad technical competencies necessary to the occupation.

Industrial core standards are technical and broad-based, and must be mastered in order for a person to work effectively in a particular industry or industrial sector. Often these standards include the specific knowledge and skills someone must master for work in specialized areas, and thus they may have less transferability than do the broad occupational core standards or the basic industry core standards.

The NTB has established eight competency levels that serve as reference points for the development and recognition of competency standards. Examples of competencies definitions for select levels are as follows:

Level 2 Competencies mean that a person has an established work orientation and the knowledge, skills, and demonstrated capacity to perform proceduralized tasks under general supervision, and more complex tasks involving the use of theoretical knowledge and motor skills under close supervision. Preparation for Level 2 employment is generally obtained through job-specific or general training that may be certified by appropriate authorities. Level 2 training typically includes an apprentice worker within many industries.

Level 4 Competencies mean that a person has highly developed skills, knowledge, or capacity for self-directed application, including the use of appropriate techniques and equipment required to perform highly complex tasks involving substantial applied theoretical knowledge and motor skills. Many of the complex tasks would be performed without supervision, and might include supervising the work of others. This category includes advanced skilled, autonomous workers; training for it would lead to an initial, post-trade, or equivalency certificate or to an advanced certificate.

Level 6 Competencies mean that a person can make autonomous use of a high degree of applied theoretical knowledge in combination with mastery of the theoretical bases of that applied knowledge. Tasks may require developed motor skills and significant creative, planning, designing, or supervisory functions related to products, services, operations, or processes. This level corresponds to a competent senior administrator, specialist, technologist, or paraprofessional. Courses of formal vocational education and training to assist in preparing for employment at this level are generally those leading to an associate diploma or a diploma. In some cases, a degree may apply.

Level 8 Competencies mean that a person has highly developed capacities to generate and use advanced levels of theoretical and applied knowledge. The tasks often require highly developed motor skills and the ability to undertake complex and major creative planning, design, and managerial functions with full personal accountability and responsibility for the output of others. This level corresponds to a competent senior professional or a manager. The formal education and training necessary at this level of employment include content leading to

higher degrees. Professional qualifications may also include postdoctoral research, evidence of publications and contribution to advancing knowledge in particular areas.[7]

It is my understanding there is mixed reception within both industry and the education and training system regarding the value of the standards. This is not surprising given their relative newness. Clearly, they are challenging traditions and cultures of the institutions involved. We in the United States are just beginning to face some of these challenges. Yet there is a strong belief among key political, industry associations and education leaders that there is no choice but to begin the quest; it will be a long term endeavour. The quest is to improve the alignment between the economic and workforce preparation system.

CRITICAL LINKS TO THE EDUCATION AND TRAINING SYSTEM

Skill standards are but one tool in the arsenal of any country's education and training system. The drivers of change within the emerging global economy, discussed earlier, are molding new requirements for the learning enterprise. A restatement of some of the key factors include a need to:

- Ensure that all new entrants to the workforce have a broad and deep understanding of the basics literacy, numerical and problem solving skills required to be successful in the new economy;

- Ensure that broad based information service systems exist to inform students of career opportunities across all industries including the pathways available to obtain those opportunities;

- Ensure efficient and effective coherence exist in a common program of study which moves the individual from the status of novice to a master, regardless of the institution where the learning occurs; and,

- Ensure that opportunities exist for the teachers and instructors to continuously be exposed to the needs of the workplace.

Helping all students be prepared

The Nordic countries and Japan among others have deserved reputations for organizing the primary and secondary schooling period in ways that ensure young people emerge from the school well grounded in the basics. This is done without establishing tracks to early in the education of the young person's life. For the United States, which has 12 years of compulsory education, at least three important lessons can be derived from such countries: I) instructional methodologies based on the operating assumptions that all children can learn are important; 2) that some form of intermediate exams during the secondary school years that provide proof of knowledge has substantial merit; and 3) that it is possible to make more effective use of the last two to three years of the free compulsory education period including occupational exploration.

Supporting information and counselling service systems

The need for students to know what the career opportunities are in a range of industries, as well as the knowledge and skill requirements for occupations within those industries, is an important ingredient for any workforce development system. While family and friends are important influences on any young person's career choices, few can provide the detailed information needed to make the choices for the global requirements of tomorrow. For the United States, and no doubt many other countries, it is important to enhance career information and

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7 Skill Standards Systems in Selected Countries, Vol. IV, Washington, D.C. Centre for Workforce Development, INstitute for Educational Leadership, 1993.

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counselling systems for use in the schools and labor market institutions. Career planning needs to be a part of curricula within the schools. Exposure to different types of occupations is needed before individuals making choices about specific training they choose to pursue. Assessments of interest and abilities need to be made available.

In order for career planning to be as holistic as possible, industry representatives need to be involved in building the information system as well as representatives of labor exchange services and educators from various levels of the learning enterprise

Establishing common programs of study

The Australian skill level requirements, discussed earlier, show how a standards based framework can be used to build a progressive set of courses and curricula across institutional levels. It does not answer several questions educators need to consider in the development of program of study. For example:

- what is best learned in the classroom versus the workplace;
- how can the curricula of the separate disciplines (language, science, social sciences, etc.) be used to infuse applied learning requirements of the various workplaces;
- what are the responsibilities of individual teachers and institutions in the development of the curricula?
- how should be curriculum be organized around career/occupational clusters and who should establish the occupational clusters;
- how can the curriculum be continually upgraded to reflect the changing technical requirements of workplace;
- what form should articulation agreements take regarding recognition for prior course work and knowledge gained in the workplace between different levels of educational institution; and,
- who should be responsible for providing the technical and financial cost for preparing, distributing, updating the curricula and instructional materials?

No doubt others could add more questions to the list. Yet these clearly represent substantial challenges to governments, education institutions, individual educators, and private sector organizations. OECD has observed that even in countries with long traditions of the social partners participating in vocational preparation of the workforce the current economic climate is posing serious demands on system and many of these questions is being reviewed. No one could argue there is any one right answer to any of these questions. Yet, if one reviews materials from several countries you will find these issues are "on the table."

Continuous professional development opportunities for instructors

This is a very large topic an(l the not the focus of this paper or conference. However, it is too important to ignore. The cited research as well as experiences in several countries can attest to the need to ensure professional development opportunities for teachers and instructors. Individual employers and industry based associations can make a substantial contribution to themselves and the learning enterprise if they provide teachers and instructors from a wide array of disciplines the opportunities to spend time in the workplace.

A final note

This has been a quick walk through a complex set of interrelated topics. Skill standard systems are being altered or established all over the world. The changing world of work demands new and different knowledge and skills of all workers. In order for there to be an alignment between the economic system of the country and the education and training institutions there must be ways to communicate the skill requirements, which are changing rapidly. There also must be ways to translate efficiently and effectively that information into materials that can be used by the education and training institutions. There is only one thing for sure: it is not an easy task.

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